

## LEPIDOPTERA FOODPLANT RECORDING FOR CONSERVATION

ANTHONY H. DOBSON

282 Britten Road, Basingstoke, Hants. RG22 4HR.

### INTRODUCTION

Have you been asked to assist in a survey on a reserve or habitat to be conserved, or to produce a list of Lepidoptera when you have operated a light trap? How can one best assist the conservation management of a reserve or habitat? Perhaps like myself, you have either made a short list of species meriting conservation, or listed the species found and added details about their relative abundance. The reserve managing body or land owner is primarily involved with the terrain, soil maintenance, plants and trees. Information is important so that the person wielding the billhook or driving heavy machinery does not rip out trees or plants, host to many or rare Lepidoptera. There is a need to record larval foodplants. In this paper, written by one primarily interested in Macrolepidoptera, data and methods of collecting and presenting this information are described and examples given: one for a reserve and the other for an agricultural and horticultural area that is being conserved. However this approach is fraught with problems and parallels will be found with Lena Ward's paper on insect foodplant records (Ward, 1988).

### METHODS

Lepidoptera records for a well-known site can often be obtained from the literature, but one is often asked to assist at a new or relatively unknown site. Records can either be based on field-work by oneself and others and/or light-trapping. For the former, observing oviposition, searching or beating for larvae by day and night, produces evidence of plant hosts. However other methods such as searching for adults on flowers, on wine ropes draped on branches and bushes (sash cord steeped in wine and sugar to avoid blemishing tree trunks with a sugar mix), at rest or in flight can be used; the wider the range of methods the more data can be obtained. However, if time is at a premium for the amateur, light-trapping is necessary and, if possible, using both actinic and mercury vapour light-traps will produce a wider range of species. During the winter months, a list of larval foodplants can be compiled from one's own field notes and also from literature sources.

A list as complete as possible of plants should be compiled. This can be obtained from either the reserve management body or from one's own observations when carrying out field-work. When records are obtained only from light-trapping, this list can be compiled from literature sources. Against this a list of Lepidoptera should be attached to the relevant foodplant.

By making use of a standard reference checklist of Lepidoptera (such as Bradley & Fletcher, 1979) much time and energy may be saved. To avoid making long lists of species' names, the numbers to be found in the log book can be listed after each foodplant. The reader can then readily see how many Lepidoptera species there are for each plant, and to discover the names of the insects can check back to the full list using the numbers. The occurrence of a species can be qualified in abbreviated form. For where the foodplant is established by either finding the larvae on it or beating, the moth species number can be followed by a dagger symbol (†). This symbol can also be used for an insect when it is known that the foodplant is possibly the only one

within the area being studied. If imagines with known foodplant(s) not to be found in the area occur, they can be labelled 'vagrants' and listed separately. An example of this is *Lithophane leautieri hesperica* Bours. (foodplants *Cupressus macrocarpa* and *C. lawnsioniana*) at a light trap in open deciduous woodland. They should be included for interest's sake. If a species has more than one foodplant, e.g. several species of *Salix* and *Populus*, it can be accounted for under the relevant foodplants, unless it is a species regarded as polyphagous. To avoid a time-consuming task and possible errors such species can be listed separately. To aid the reader of the report, the plant list can be divided into three sections: tree and shrub layer; ground cover herbaceous plants, and ground cover grasses, rushes and sedges. A part of the report can include comments on the area, its habitats, a few ideas on improvement if necessary, highlighting Lepidoptera at risk and the need for certain plant/tree species to be increased or discouraged.

#### FOODPLANT DATA AND SOME PROBLEMS INVOLVED

With lists of Lepidoptera numbers attached to each plant, a false impression might be given that plant species with fewer Lepidoptera attached are of little importance. To counter this, numbers marked with a dagger symbol (†) indicate the importance of the foodplant. For scarce Lepidoptera an asterisk (\*) can be put by the number to indicate its greater importance.

There are inevitable problems with recording foodplant data. The ideal situation is for one to base foodplant records on one's own experience. Even then, should one include all foodplants? For example, a nearly full grown larva of *Amphipyra pyramidea* L. was found at Sparsholt on a *Cotoneaster* plant growing in an open situation in one of the beds and was feeding on the plant. It was given *Quercus robur* foliage but refused to eat it, being quite contented with its *Cotoneaster*! It was bred through, but the record has to be ignored as deviant to normal behaviour for this arboreal species. If one has found a species on one foodplant but other foodplants recorded in literature are also to be found in the area being worked, should one record these? Through fear of having overlooked the larvae (in particular with arboreal foodplants the larvae may well have been unseen or the foliage out of reach of the beating stick) one should record them.

For the examples which follow, the bulk of the foodplant data were extracted from the literature, but as will be shown accuracy can be difficult to obtain. In my earlier years, data was largely from Scorer's (1913) entomologist's log book, which I found useful for annotating with my field notes. Later I used Allan's (1949) *Larval foodplants*, which I still use as my working book annotating with my own notes, updating with Heath and Emmet (1983 & 1984). One problem with older data is that of all the foodplants included the most popular pabulum or even the natural foodplants are not always indicated. The main emphasis has been to rear the perfect insects from ova using easily accessible plants. With Allan, one is led to believe that all possible foodplants have been recorded including some which appear rather unusual, e.g. for *Stauropus fagi* L.: '*Fagus sylvatica*, *Quercus robur*, *Betula alba*, *Corylus avellana*, *Pyrus malus*, *Alnus glutinosa*, *Crataegus oxyacantha*, *Prunus spinosa*, *Tilia europaea*, *Rosa canina*, has also been found on *Salix* spp.' The occasional larvae I have found were only on *Quercus* and imagines have often visited the light trap operated in oak woods where *Fagus* was absent. So in my experience *Quercus* is the moth's most popular pabulum though others have found it to be *Fagus*. All the rest of the foodplants listed for *fagi* in my copy of Allan's book have been crossed out except *Betula* and *Corylus*, as they have been mentioned in recent literature (Heath and Emmet, 1979). In recent years I have tried to include as many

Microlepidoptera as possible and for their foodplants, have depended on the Society's field guide, recently updated (Emmet, 1988).

With literature covering the whole country, geographical variation is not well covered; more useful information could possibly be obtained by studying and recording foodplants at a county level. Foodplant data could be compiled for or by Naturalists' Trusts on databases, so that geographical comparisons can be made by the recorder. Over a period of years one problem with listing checklist numbers against the foodplant is that the classification and nomenclature is never static; the log book numbers will have to be altered whenever the updated lists are published.

Foodplant data should not only include those foodplant species which in the locality have been proven; those foodplants, which if found in the locality could be possible hosts to insects, should also be noted. Nature reserves are becoming oases in terrain that has been agriculturalized, afforested or developed for housing, roads and industry. It is important to list *possible* foodplants for the survival of both static and nomadic populations of insects.

#### APPENDIX 1

A wet heath and woodland area has recently been acquired for a reserve. Plants lists were not to hand, and it was a case of visiting the new reserve to discover the insect life. As the reserve comprises some 200 acres and includes a variety of habitats, the reserve was divided into numbered areas. Below are extracts from the report produced at the end of 1987. First, the Lepidoptera species are listed. The numbers before the name refer to the checklist number of Bradley & Fletcher. Second, the foodplants are listed for one area. † by the insect species number indicates that the foodplant is proven or is the only possible foodplant for that species. Relative abundance key: ab abundant, vc very common, c common, fc fairly common, sc scarce, occ occasional, r rare, loc local. Finally, some suggestions are made for conservation.

#### *Lepidoptera species list*

- 1627 *Coenonympha pamphilus* L. small heath 6
- 1629 *Aphantopus hyperantus* L. the ringlet 5, 6, 8, 11, 18
- 1632 *Trichiura crataegi* L. pale eggar 6, 11, 12, 20
- 1634 *Malacosoma neustria* L. the lackey 6
- 1638 *Macrothylacia rubi* L. fox moth 6
- 1640 *Philudoria potatoria* L. the drinker 6
- 1645 *Falcaria lacertinaria* L. scalloped hook-tip 5, 7, 11
- 1648 *Drepana falcataria* L. pebble hook-tip 7
- 1652 *Thyatira batis* L. peach blossom 5
- 1653 *Habrosyne pyritoides* Hufn. buff arches 5, 7
- 1654 *Tethea ocularis* L. figure of eighty 7
- 1658 *Cymatophorima diluta* D. & S. oak lutestring 7
- 1661 *Archiearis parthenias* L. orange underwing 5, 6, 8, 12
- 1665 *Pseudoterpna pruinata* Hufn. grass emerald 6
- 1666 *Geometra papilionaria* L. large emerald 5, 6, 7
- 1667 *Comibaena bajularia* D. & S. blotched emerald 5
- 1669 *Hemitea aestivaria* Hb. common emerald 6, 7, 12
- 1674 *Jodis lactearia* L. little emerald 7
- 1677 *Cyclophora albipunctata* Hufn. birch mocha 6, 7
- 1680 *C. punctaria* L. maiden's blush 5, 7, 10, 19, 20
- 1682 *Timandra griseata* Peters. blood-vein 6, 8, 19, 20
- 1693 *Scopula floslactata* Haw. cream wave 7, 13, 18, 19, 20
- 1711 *Idaea trigeminata* Haw. treble brown spot 7
- 1713 *I. aversata* L. riband wave 5, 6, 8
- 1722 *Xanthorhoe designata* Hufn. flame carpet 6
- 1724 *X. spadicearia* D. & S. red twin-spot carpet 7, 8, 19, 20

- 1725 *X. ferrugata* Cl. dark-barred twin-spot carpet 17  
 1727 *X. montanata* D. & S. silver-ground carpet 5, 7, 13, 17, 18, 20  
 1728 *X. fluctuata* L. garden carpet 7  
 1732 *Scotopteryx chenopodiata* L. 8, 12, 13, 18  
 1734 *S. luridata plumbaria* F. July belle 6

### Foodplant list

#### Area 6

#### Shrubs

*Betula* 375 † sc & loc, 381 fc, 410 sc, 1092 † fc, 1093 † fc, 1134 † fc, 1156 † sc, 1632 † occ, 1661 † fc, 1666 † sc, 1755 occ, 1773 occ, 1796 † r, 1799 † occ, 1837 occ, 1904 r, 1926 † r, 1931 fc, 1935 † c, 1944 sc, 1955 fc, 1994 r, 2000 sc, 2030 sc, 2128 r, 2130 sc, 2150r, 2156 fc, 2268 fc, 2280 † r, 2421 occ

Lichen on trees 2040 c

Mosses on trees 1334 fc, 1344 fc

*Quercus* 1033 vc, 1634 † r, 1669 † r, 1773 occ, 1779 † occ, 1837 occ, 1904 r, 1931 fc, 1944 sc, 1994 r, 2030 sc, 2150 r, 2183 † sc

*Salix* spp. 701 † occ, 1755 fc, 1777 † c, 1811 † r, 1828 occ, 1837 occ, 1887 † fc, 1904 r, 1931 fc, 1955 † fc, 1981 † r, 2017 † sc, 2030 sc, 2109 occ, 2128 r, 2130 sc, 2156 fc, 2158 r, 2182 † occ, 2225 sc, 2268 fc, 2273 † loc c, 2274 † loc fc, 2318 † fc, 2421 loc c

Vagrant 1898 r (*Pinus sylvestris* and *Larix decidua*)

#### Ground Cover Herbaceous Plants

*Angelica sylvestris* wild angelica 1835 sc

*Calluna vulgaris* ling 1638 r, 1734 sc, 1755 fc, 1828 occ, 1941 † r, 1952 sc, 2109 occ, 2118 c, 2484 fc

*Cirsium* spp. thistles 945 r, 1108 occ, 1458 r

*Crepis taraxacifolia* hawk's-beard 1840 sc

Cruciferae 1722 r

*Erica cinerea* bell heather 1451 sc, 1952 sc, 2118 c

*E. tetralix* cross-leaved heath 1451 sc, 1638 r, 1828 occ, 1941 occ, 1952 sc

*Genista anglica* needle furze 1255 fc, 1665 r, 1734 sc

*Leontodon hispidus* greater hawkbit 1840 sc

Lichens on ground & on heather 2040 c, 2047 sc

Mosses 1334 fc

*Plantago* spp. 2089 occ, 2361 occ, 2381 r

Polyphagous on herbaceous plants 1076 occ, 1524 r (usually *Calystegia* or *Convolvulus* but occasionally on other herbaceous plants), 1828 occ (on flowers), 1837 occ (on flowers), 2102 c, 2107 fc, 2334 occ

*Rumex* spp. docks & sorrels 1561 r, 1682 occ, 1713 sc, 1742 occ, 2059 occ, 2089 occ, 2126 r, 2130 sc, 2134 sc, 2150 r, 2156 fc, 2158 r, 2161 occ, 2381 r, 2421 occ

*Salix repens* creeping willow 1638 r, 2017 ? (searched for but larvae not found), 2126 r

*Serratula tinctoris* saw-wort 699 † fc, 2299 occ

*Succisa pratensis* devil's bit scabious 1828 occ, 2059 fc

*Taraxacum officinale* dandelion 1713 sc, 1742 occ, 2059 fc

*Trifolium pratense* & *repens* 2462 occ (1 larva found resting on grass)

*Ulex* gorse 911 † r, 1255 † fc, 1665 r, 1734 sc, 1862 r

Vagrants 1807 (*Rhinanthus minor* yellow rattle), 1894 r (*Trifolium* spp but usually in drier habitats)

#### Ground Cover Grasses, rushes & sedges

*Agropyron repens* 1531 fc, 1625 sc, 1626 fc, 1629 r, 1640 fc, 2321 r, 2330 occ

### Suggestions for conservation

Please keep and encourage further growth of *Calluna vulgaris* (ling) and *Erica tetralix* (cross-leaved heath). Though only a few Lepidoptera use these as foodplants, there is potential for other species to move in. Perhaps these plants could be extended by felling of woodland in neighbouring areas. A lush herbage should be encouraged in places, particularly as *Metricoptera brachyptera* L. (marsh bush cricket), was found here. In the literature it is stated that cross-

leaved heath is necessary for this species. *Ulex* (gorse) needs to be restricted to its present extent, which is enough to support species attached to it. The grassy area with few birches supports strong colonies of 2156 *contigua* (*Salix* spp and *Betula* in damp heaths) and 2196 *pudorina* (graminae). Please leave the isolated stands of *Salix* (sallow), *Quercus* (oak) and *Betula* (birch) as they support so many species, some of which favour isolated bushes on heathland.

#### APPENDIX 2

A Robinson mercury vapour light trap has been operated at Sparsholt College, Hampshire on 15 nights in 1986 and 30 nights in 1987 and 1988. The nights selected were either for optimum weather conditions or for educational use with visiting school parties the following morning. In 1988 the Rothamsted survey insect light trap was operated every night except for 7 nights when bulb failure occurred. The traps are being operated for two purposes: one is for educational use, the second is for recording both qualitatively and quantitatively the Lepidoptera as an environmental indicator to changes taking place in the landscape. The aim is to record the foodplants of the Lepidoptera to reflect the quality of plant and tree life in the area. This will relate to the 10-year college farm conservation plan which is now in its second year, and hopefully a richer fauna will be recorded with the improvements to the farm such as new hedges and shelterbelts and reduced spraying on headlands and lane-verges. The data produced has already influenced some decisions made on clearance and planting.

Sparsholt College is approximately 4 miles west-north west of Winchester. It occupies 177 hectares of which the College farm covers 144 hectares. This area is farmed commercially and at the same time is used intensively for education and training purposes. The traps are operated outside the schools' unit and close to the parkscape and ponds of the horticultural department.

Below are extracts from the various reports. First, the Lepidoptera species are listed for 1987 mercury vapour light trapping. The numbers before the names refer to the checklist numbers of Bradley and Fletcher and the numbers after the names refer to the total number of specimens. Second, the foodplants are listed for 1987 Lepidoptera species. This was an academic exercise as at present there is little field-work data and many of the trees have foliage out of reach for using a beating tray. † by the moth species number indicates that the foodplant is the only recorded foodplant in the literature for that species or is the only known foodplant present on the College land. N indicates that the foodplant was not found on College land. Third, the foodplants and the numbers of Lepidoptera for each foodplant from 1986 to 1988. The development of the light trapping has produced results which are difficult to compare because of differences in the number of nights the traps were operated. In future years the operating frequency pattern will follow the 1988 pattern, so that changes can be monitored more clearly. Operating traps in reserves annually could provide data for foodplants to reflect success or failure of conservation work. Light trapping by Lepidopterists living near reserves, farm land or parks could, by using the methods described to produce foodplant lists, reflect the present situation. Data could be produced to support the case for improvements. However recording over a period of years will probably show variation in numbers due to weather conditions. At Sparsholt 1988 was comparatively a poor year. The full lists of moth species reveal that the autumn of 1987 was poor compared with the autumns of 1986 and 1988. Fourth, some comments and suggestions are made.

#### *Lepidoptera species list*

2155 <i>Melanchnra persicariae</i> L.	34	2187 <i>O. stabilis</i> D. & S.	31
2157 <i>Lacanobia w-latinum</i> Hufn.	4	2188 <i>O. incerta</i> Hufn.	1
2158 <i>L. thalassina</i> Hufn.	2	2190 <i>O. gothica</i> L.	37
2160 <i>L. oleracea</i> L.	76	2192 <i>Mythimna conigera</i> D. & S.	1
2164 <i>Hecatera bicolorata</i> Hufn.	1	2193 <i>M. ferrago</i> F.	12
2166 <i>Hadena rivularis</i> F.	2	2198 <i>M. impura</i> Hb.	160
2177 <i>Tholera cespitis</i> D. & S.	1	2199 <i>M. pallens</i> L.	1022
2182 <i>Orthosia cruda</i> D. & S.	6	2232 <i>Aporophyla nigra</i> Haw.	6
2186 <i>O. gracilis</i> D. & S.	1		

## Foodplant list

## Tree and shrub layer

- Acer campestre* (field maple) 290, 462, 970, 1032, 1876, 2009 †, 2279, 2425  
*A. platanoides* (Norway maple) 1032  
*A. pseudoplatanus* (sycamore) 161, 290, 462, 1032, 1036, 2110, 2279  
*Aesculus hippocastanum* (horse chestnut) 161, 2279  
*Alnus glutinosa* (alder) 970, 1648, 1657, 1666, 1876, 1913, 1956, 1979, 2000, 2187, 2280, 2425  
*Betula* spp. (birch) 161, 410 †, 663, 970, 1093 †, 1632, 1648, 1657, 1666, 1762, 1764, 1773, 1904, 1912, 1913, 1915, 1940, 1956, 1958, 1979, 1999, 2000, 2006 †, 2008, 2030, 2033, 2109, 2110, 2114, 2120, 2128, 2138, 2150, 2187, 2279, 2280, 2283, 2284, 2322, 2425  
*Carpinus betulus* (hornbeam) 161, 994, 1032, 2325  
*Chamaecyparis lawsoniana* (Lawson's cypress) 1827  
*Clematis vitalba* (traveller's joy) 1781 †, 1813 †, 1825, 1862  
*Corylus avellana* (hazel) 969, 970, 1632, 1657, 1666, 1777, 1906, 1999, 2000, 2008, 2110, 2111, 2128, 2182, 2422, 2425  
*Crataegus monogyna* (hawthorn) 161, 441 †, 450, 455, 994, 1037, 1048, 1083, 1632, 1669, 1764, 1834, 1837, 1853, 1860, 1862, 1884, 1906, 1912, 1958, 2020, 2030, 2077, 2109, 2110, 2111, 2114, 2120, 2128, 2158, 2182, 2283, 2284, 2299, 2425  
 Dead wood and fungus 224 †, 642 †  
*Euonymus europaeus* (spindle) 451 †, 1465 †, 1888 †  
*Fagus sylvatica* (beech) 161, 663, 1647 †, 1666, 1681 †, 1904, 1915, 1999, 2008, 2014, 2187, 2422, 2425  
*Fraxinus excelsior* (ash) 969, 1011, 1914 †, 1976, 2269 †, 2291 †  
*Ilex aquifolium* (holly) 1862  
*Juniperus* spp. (junipers) 1827, 1854 †  
*Larix decidua* (larch) 1002, 1856 †, 1893, 1940, 1962  
 Lichens on trees 2040 †, 2043 †, 2044 †, 2050 †, 2473 †  
*Ligustrum* spp. (wild & garden privet) 161, 994, 1002, 1011, 1378, 1936, 1976  
*Lonicera periclymenum* (wild honeysuckle) N 161, 453 †, 1002, 1747, 2120, 2158, 2442, 2443  
*Malus* spp. (crab apple & cultivars) 161, 455, 970, 994, 1037, 1048, 1452, 1632, 1860, 1906, 2020, 2030, 2033, 2077, 2158, 2188, 2283, 2284, 2425

Foodplants and numbers of *Lepidoptera* for each foodplant, 1986–1988

No. of nights operated m.v.	1986	1987	1988
Roth.	15	30	30
			350
Tree and shrub layer			
<i>Acer campestre</i> (field maple)	4	8	8
<i>A. platanoides</i> (Norway maple)	1	1	1
<i>A. pseudoplatanus</i> (sycamore)	5	7	5
<i>Aesculus hippocastanum</i> (horse chestnut)	1	2	1
<i>Alnus glutinosa</i> (alder)	13	12	7
<i>Betula</i> spp. (birch)	26	40	33
<i>Carpinus betulus</i> (hornbeam)	6	4	3
<i>Chamaecyparis lawsoniana</i> (Lawson's cypress)	2	1	2
<i>Clematis vitalba</i> (traveller's joy)	4	4	6
<i>Corylus avellana</i> (hazel)	12	16	12
<i>Crataegus monogyna</i> (hawthorn)	32	35	41
Dead wood and fungus	0	2	0
<i>Euonymus europaeus</i> (spindle)	1	3	2
<i>Fagus sylvatica</i> (beech)	10	13	12
<i>Frangula alnus</i> (alder buckthorn) N	1	0	2
<i>Fraxinus excelsior</i> (ash)	8	6	4
<i>Ilex aquifolium</i> (holly)	1	1	4
<i>Juniperus</i> (garden spp.)	1	2	1
<i>Larix decidua</i> (larch)	1	5	2

	1986	1987	1988
<i>ligustrum</i> spp (wild & garden privet)	4	7	5
<i>Lonicera periclymenum</i> (wild honeysuckle) N	8	8	10
<i>Malus</i> spp (apple including cultivars)	16	19	17
<i>Picea abies</i> (Norway spruce)	1	0	0
<i>Pinus</i> spp. (pine)	5	6	3
<i>Populus</i> spp. (poplars)	17	16	17
<i>Prunus domestica</i> (plum)	12	9	9
<i>P. padus</i> (bird cherry) N	4	5	5
<i>P. spinosa</i> (blackthorn)	21	22	26
<i>Pyrus communis</i> (pear)	8	10	9
<i>Quercus robor</i> (oak)	26	44	38
<i>Q. ilex</i> (evergreen oak)	1	1	1
<i>Rhamnus catharticus</i> (buckthorn)	1	1	2
<i>Ribes</i> spp. (currant)	1	2	2
<i>Rosa</i> spp. (wild roses)	4	9	10
<i>Rubus fruticosus</i> agg. (bramble)	10	12	12
<i>Salix alba</i> (white willow)	26	27	27
<i>S. caprea</i> (pussy or goat willow)	38	45	44
<i>S. cinerea</i> (common willow)	31	35	24
<i>Sambucus nigra</i> (elder)	0	2	1
<i>Swida sanguinea</i> (dogwood)	0	0	1
<i>Syringa vulgaris</i> (lilac)	4	4	3
<i>Tilia</i> spp. (lime)	8	8	6
<i>Viburnum lantana</i> (wayfaring tree)	1	1	1
<i>V. opulus</i> (guelder rose)	1	0	0
Polyphagous on native deciduous trees and shrubs	14	22	22
Birds' nests	0	1	1
Ground Cover Herbaceous Plants			
<i>Anthriscus sylvestris</i> (cow parsley)	0	3	4
<i>Achillea millefolium</i> (yarrow)	2	3	6
Aquatic plants	1	1	1
<i>Arctium minus</i> (lesser burdock)	4	2	2
<i>Artemisia vulgaris</i> (mugwort)	1	3	3
<i>Arum maculatum</i> (lords & ladies)	1	0	0
<i>Astragalus glycyphyllos</i> (wild liquorice) N	1	1	0
<i>Brassica</i> spp	2	3	3
<i>Bryonia dioica</i> (white bryony)	1	1	0

#### Comments and suggestions on conservation

Tree/shrub hosts with the largest number of species (average for the 3-year period) are *Salix caprea* 42.3, *Crataegus* and *Quercus* 36 each, *Betula* 33, *Salix cinerea* 30, *S. alba* 26.6 *Prunus spinosa* 23, *Malus* 17.3, and *Populus* 16.6. These figures are not cumulative, e.g. some species occurred in 1987 but not in 1988 and vice versa. The cumulative total for *Betula* is 50 species. An average of 20 polyphagous species can be added onto these numbers. You will note that there has been a fall in numbers for *Alnus*, *Betula*, *Quercus* and *S. cinerea*. *Quercus* numbers could have been partly influenced by the hurricane felling oak trees. There has been a decline in moth species with *Fraxinus* as their only foodplant. The hurricane brought down a nearby tree and another was lost previously by disease. It is hoped that the planting of ash under the 10-year conservation plan will improve the situation. It is hoped that some *Salix caprea* will be planted, as at present there is only one small bush. For the ground cover plants there has been little change, except for *Achillea millefolium* which is increasing.

## REFERENCES

- Allan, P. B. M. 1949. *Larval foodplants*. London.
- Bradley, J. D. & Fletcher, D. S. 1979. *A recorder's log book or label list of British butterflies and moths*. London: Curwen.
- Emmet, A. M. (Ed.) 1988. *A field guide to the smaller British Lepidoptera*. 2nd edn. London: BENHS.
- Heath, J. & Emmet, A. M. 1983. *The moths and butterflies of Great Britain and Ireland*, Vol 9. London: Curwen.
- Heath, J. & Emmet, A. M. 1984. *The moths and butterflies of Great Britain and Ireland*, Vol 10. Colchester: Harley.
- Scorer, A. G. 1913. *The entomologist's log book and dictionary of the life histories and foodplants of the British Macro-Lepidoptera*. London.
- Ward, L. K. 1988. The validity and interpretation of insect foodplant records. *Br. J. Ent. Nat. Hist.* **1**, 153-162.

